

**Round Rock ISD – 2009-10**  
**Lesson 1 – Grade 3**  
**Patterns & Algebraic Reasoning Model Lesson**

**Patterns on a Number Line – Using a Thermometer\***

\*Lesson is adapted from activities in *Sizing Up Measurement: Activities for Grade 3-5*, by Chris Confer, Math Solutions Publications, 2007 and *ThinkMath!*, Harcourt School Publishers, 2009.

**Mathematics, Grade 3**

**Materials:**

- Thermometers - included in RRISD Measurement kit
- Large display thermometer – included in RRISD Measurement Kit (or display a thermometer with a document camera)

**TEKS/SEs:**

- 3.6 A – identify and extend whole-number and geometric patterns to make predictions and solve problems
- 3.10 A – locate and name points on a number line using whole numbers and fractions, including halves and fourths
- 3.12A – use a thermometer to measure temperature

**Objective 6 TEKS/SEs (Underlying Processes and Mathematical Tools):**

- 3.14A – identify the mathematics in everyday situations
- 3.14B – solve problems that incorporate understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness
- 3.14C – select or develop an appropriate problem-solving plan or strategy, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem
- 3.14D – use tools such as real objects, manipulatives, and technology to solve problems
- 3.15A – explain and record observations using objects, words, pictures, numbers, and technology
- 3.15B – relate informal language to mathematical language and symbols
- 3.16A – make generalizations from patterns or sets of examples and nonexamples
- 3.16B – justify why an answer is reasonable and explain the solution process

**Lesson objective(s):**

- Students explore patterns on a thermometer and on a number line.

**Differentiation strategies to meet diverse learner needs:**

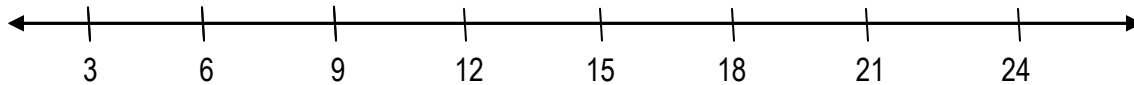
- Problem- solving, inquiry-approach
- Hands-on exploration
- Collaboration and discussion
- Silent teaching

**ENGAGEMENT: Silent Teach**

- In Silent Teach, neither the teacher nor the students speak at all. Students must have “eyes on the teacher” to figure out what is happening. The teacher selects students to contribute – teacher’s choice, no hand-raising or volunteering. Students indicate with thumbs-up-down-sideways whether they agree with a student contribution.
- Silently show students the number line below on the board. Add one number at a time, pausing as if considering what you should write. Repeat this process one number at a time until three or four numbers are placed correctly in a row.
- Hand the marker to a student to fill in the next missing number. Use silent gestures to solicit thumbs-up or down from students, and to approve or correct the child’s decision. If the student correctly fills in the number, nod silently and repeat the process for another number. If the student writes an incorrect number, shake your head, erase the number, and motion for another student to try. Repeat several times, possibly skipping a number or more and having students fill in some of the numbers out of order.
- Continue in the same manner until the line is complete.

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- Then break the silence, and have children describe what patterns they saw with placing the numbers on the number line.



### EXPLORATION

#### Part 1:

- Display a large display thermometer or display a thermometer using a document camera. Begin the lesson by explaining to students that they will focus on the number patterns which can be found on thermometer.
- Review multiples. Have students partner up and tell them to identify a number whose multiples they would like to explore.
- On the document camera, point out the multiples of five or two. Begin with 0, pointing out that 0 is a multiple of every number. Ask for volunteers to explain why this is so. (Zero times any number is 0.)
- Have students help you read the numbers from the highest temperature to the lowest temperature. As they read the numbers aloud, list what they say on the board. Tell them they will also list a number pattern on a piece of paper.
- Ask students to examine your list of numbers and describe the patterns they see. Each time a student describes a pattern, write it on the board.

#### Part 2:

- Explain to students they will now select a number and explore its multiples in the same way you just did with multiples of five. Provide students with thermometers.
- Write their instructions on the board:
  - Select a number to explore: 2, 3, 4, 5, 10, 15, or 20
  - Using the thermometer, list the number and its multiples on your paper.
  - Examine the patterns in your list.
  - On your paper, write what you notice about the patterns.
  - Explore a different set of multiples.

### EXPLANATION

- Students will explain their thinking and justify their solutions in groups and in whole-class discussion, as well as with tables, diagrams, and written explanations.

### ELABORATION

- Have students partner up and repeat the Engagement activity, each using more challenging multiples.

### EVALUATION

- As an informal evaluation, discuss the patterns they discovered in their multiples. As students describe the patterns they noticed, have other students determine whether they agree. Ask other students whether the same patterns emerged in their multiples.
- Do students understand that the scale on a thermometer is a kind of number line?
- Do students understand that the distance between tick marks is constant and that moving the same number of tick marks on a number line or thermometer represents the same numerical distance no matter where you are on the number line or thermometer?
- Can students skip count with different numbers on a number line or thermometer?
- Can students read a thermometer? Do they understand what number each tick mark represents? Can they tell you where numbers such as 77 are on the thermometer (between which tick marks)?